

March 22, 2004

**MEMORANDUM  
04-04**

**TO:** District Directors  
District Construction Engineers  
Toll Road Operations Engineer  
District Material & Tests Engineers  
District Area Engineers  
Project Engineers/Supervisors

**FROM:** Dennis A. Kuchler, Chief  
Contracts and Construction Division

**RE:** Standard Specifications Section 213, Flowable Backfill

The specification for flowable backfill requires revision. The revised specification is below. All contracts that include flowable backfill let between January 2004 to and including April 2004, require modification to include the attached specification. Contracts being let beginning in April 2004 will include the revised specification as a special provision.

The changes in the specification should require no cost adjustments to active contracts. The revised specification is below:

**SECTION 213 – FLOWABLE BACKFILL**

**213.01 Description.** This work shall consist of placing flowable backfill in trenches for pipe structures, culverts, utility cuts and other work extending under pavement locations, to fill cavities beneath slopewalls and other locations in accordance with 105.03.

**MATERIALS**

**213.02 Materials.** Materials shall be in accordance with the following:

Concrete Admixtures.....	912.03
Fine Aggregate* .....	904
Fly Ash.....	901.02
Portland Cement .....	901.01(b)
Water .....	913.01

\* Except that steel furnace slag shall not be used

The supplier may propose an alternate air entraining admixture. The proposed admixture shall be included in the flowable backfill mix design, FBMD.

If fly ash is used as a filler and not as a pozzolan, the fly ash shall be in accordance with 904.

The supplier may elect to use gradations in accordance with 904 or may propose the use of alternate gradations. The alternate gradation and proposed tolerances of material passing each sieve shall be included in the FBMD. ~~flowable backfill mix design.~~

**213.03 Flowable Backfill Mix Design.** The Contractor shall submit a ~~flowable backfill mix design~~, FBMD, to the Engineer and arrange a trial batch. The FBMD will be approved based on compliance with 213.04. The FBMD shall be submitted in a format acceptable to the Engineer and shall include the following:

- (a) a list of all ingredients
- (b) the source of all materials
- (c) the gradation of the aggregates
- (d) the batch mass (weight)
- (e) the names of all admixtures
- (f) the admixture dosage rates and manufacturer's recommended range

After the completion of the trial batch and all test results have been reviewed for compliance with the specifications, a mixture number will be assigned by the Engineer.

Mix design changes will not be allowed after the FBMD approval, except for adjustments to compensate for routine moisture fluctuations. All other changes require a new FBMD.

**213.04 Flowable Backfill Mix Criteria.** The FBMD shall produce a workable mixture with the following properties:

**(a) Flow.** The test for flow shall consist of filling a 75 mm (3 in.) diameter by 150 mm (6 in.) high open-ended cylinder placed on a smooth level surface to the top with the flowable mortar. If necessary, the cylinder shall be struck off so that the mixture is level. The cylinder shall be pulled straight up within 5 s. The spread of the mortar shall be measured. The diameter of the mortar spread shall be at least 200 mm (8 in.). Minor flow adjustments may be made by making minor adjustments in the water or fly ash filler content in the mixture.

**(b) Average Penetration Resistance.** The average penetration resistance in 14 days shall not be greater than 34 500 kPa (5,000 psi) nor less than 8000 kPa (1,200 psi) in accordance with ITM 213.

**213.05 Flowable Backfill Trial Batch.** A trial batch shall be produced by the Contractor and tested by the District Materials and Tests Engineer to verify that the FBMD meets the flowable backfill mix criteria. The flowable backfill shall be batched within the proportioning tolerances of 508.02(b). The Engineer will determine and provide the Contractor with test results. The trial batch shall be of sufficient quantity to allow the Engineer to perform all required tests from the same batch.

**213.06 Mixing Equipment.** The mixing equipment shall be in accordance with the applicable requirements of 702 or 722, except that in lieu of the calibration requirements of 722.11, the mixer operator shall make delivery in a properly calibrated continuous mixer.

## CONSTRUCTION REQUIREMENTS

**213.07 Placement.** The flowable backfill shall not be placed on frozen ground. Flowable backfill shall be protected from freezing until the material has set.

The diameter of the flowable backfill spread shall be at least 200 mm (8 in.) at time of placement.

The flowable backfill shall be brought up uniformly to the fill line as shown on the plans or as directed.

The flowable backfill shall not be subjected to load nor disturbed by construction activities until minimum penetration resistance has been achieved. Testing shall be in accordance with ITM 213. The minimum penetration resistance shall be as follows:

For PCCP.....	500 kPa (70 psi)
For all Other Applications .....	8000 kPa (1200 psi)

**213.08 Method of Measurement.** Flowable backfill will be measured by the cubic meter (cubic yard) as computed from the neat line limits shown on the plans, or as adjusted. If neat line limits are not shown on the plans, the volume in cubic meters (cubic yards) of flowable backfill furnished and placed will be computed from the nominal volume of each batch and a count of the batches. Unused and wasted flowable backfill will be estimated and deducted. Drilled holes will be measured by the number of holes drilled.

**213.09 Basis of Payment.** The accepted quantities of flowable backfill will be paid for at the contract unit price per cubic meter (cubic yard) furnished and placed. Holes drilled in the pavement will be paid for at the contract unit price per each.

DAK:JGJ:jgj

cc: Operations Support